

AP Statistics Practice Test (page 279)

T4.1 c. A census is defined to be measuring all individuals in the population.

T4.2 e. Ignore numbers that are larger than 816 or are duplicate numbers.

T4.3 d. In order to infer cause and effect, we must run a well-designed experiment. This was an observational study.

T4.4 c. This is the definition of a simple random sample.

T4.5 b. By randomly assigning treatments we are attempting to make the treatment groups be as similar as possible so that we can prevent confounding.

T4.6 b. It is very difficult to show cause and effect using observational studies. It is much easier in an experiment where the researcher has control over how the treatments are applied.

T4.7 d. By stratifying we can control how many people we survey in each of the different kinds of areas.

T4.8 d. Bias in the responses means that you are getting responses that are systematically different from the truth.

T4.9 d. This is a completely randomized design because you randomly assign subjects to one of the four groups. There are two factors: length of ad (30 seconds or 60 seconds) and number of repetitions (1 time or 3 times).

T4.10 b. In a matched pairs design, the two observations in the pair should be as similar as possible. So use a subjective method for pairing the plots. Once the pairs are chosen, randomly assign the two treatments to the two plots in the pair.

T4.11 d. The teachers who responded likely feel more strongly about the issue and shouldn't be considered to be representative of the entire population of teachers under consideration.

T4.12 (a) The experimental units are the acacia trees. The treatments are placing either active beehives, empty beehives, or nothing in the trees. The response variable is the damage caused by elephants to the trees.

(b) Randomly assign 24 of the acacia trees to have active beehives placed in them, 24 to have empty beehives placed in them, and the remaining 24 to remain empty. To do this, assign the trees numbers from 01 to 72 and use a random number table to pick 24 different 2-digit numbers in this range. Those trees will get the active beehives. The trees associated with the next 24 different 2-digit numbers will get the empty beehives and the remaining 24 trees will remain empty. Compare the damage caused by elephants to the trees with active beehives, those with empty beehives, and those with no beehives.

T4.13 (a) It is not a simple random sample because not all possible samples of size 1067 were possible. For example, using their method they could not have had all respondents from the east coast.

- (b) If the household members who typically answer the phone have a different opinion than those who don't typically answer the phone, there will be bias. By randomly choosing the respondent within each household they can avoid such potential bias.
- (c) There was undercoverage because those who do not have telephones or those who have only cell phones could not be part of the sample. If these groups have different opinions than the group of people with residential lines, there will be bias.

T4.14 (a) Each of the 11 individuals will be a block in a matched pairs design. Each participant will take the caffeine tablets on one of the two-day sessions and the placebo on the other. The blocking was done to account for individual differences in dexterity. In a completely randomized design, the variability between subjects might make it harder to determine if caffeine has an effect on tapping speed.

(b) The order was randomized to control for any possible influence of the order in which the treatments were administered on the subject's tapping speed. For example, after the first trial subjects might practice the tapping task and do better the second time. If all the subjects got caffeine the second time, the researchers wouldn't know if the increase was due to the practice or the caffeine.

(c) It is possible to carry out this experiment in a double-blind manner. This means that neither the subjects nor the people who come in contact with them during the experiment (including those who record the number of taps) have knowledge of the order in which the caffeine or placebo was administered.